A2300 GENLOCK
TECHNICAL SPECIFICATIONS
(NTSC)

AUGUST, 1988 PN-314871-01

commodore COMPUTERS

A2300 GENLOCK
TECHNICAL SPECIFICATIONS
(NTSC)

AUGUST, 1988 **PN-314871-01**

Commodore Business Machines, Inc.
1200 Wilson Drive, West Chester, Pennsylvania 19380 U.S.A.

Commodore makes no express or implied warranties with regard to the information contained herein. The information is made available solely on an as is basis, and the entire risk as to completeness, reliability, and accuracy is with the user. Commodore shall not be liable for any damages in connection with the use of the information contained herein. The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty as to quality or suitability of such replacement part. Reproduction or use without express permission, of editorial or pictorial content, in any matter is prohibited.

This manual contains copyrighted and proprietary information. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of Commodore Electronics Limited.

Copyright © 1988 by Commodore Electronics Limited.
All rights reserved.

TABLE OF CONTENTS

TITLE	PAGE
TECHNICAL SPECIFICATIONS	1
COMPONENT FUNCTIONS	4
CONNECTOR PINOUTS	6
ELECTRICAL CHARACTERISTICS	8
ADJUSTMENT PROCEDURES	9
COMPONENT PARTS LIST	11
PCB OUTLINE (NTSC)	14
SCHEMATIC DIAGRAM (NTSC)	16

Technical Specifications

These specifications apply to both Models A2300 (NTSC) and A2301 (PAL) unless otherwise noted. If there is a difference between the two models, the specifications for Model A2301 will be in italics and enclosed in parentheses.

Theory of Operation

When the Genlock is attached to the Amiga 2000 computer, the system clock for the A2000 comes from the 28MHz VCO (Voltage controlled oscillator) on the Genlock unit. During the power-up sequence, the A2000's Kickstart configures the computer into an external synch mode. The Genlock unit extracts the horizontal and vertical timing information from the external source video and resets the horizontal and vertical counters of the computer so that the computer video is synched to the external video. When the external video source is removed, the computer is self-synchronized.

The Genlock also allows for video overlay of the computer graphics over the source video. The incoming composite video is decoded into RGB components, and the computer's RGB is keyed in over the external video RGB. The combined video signal then goes to the RGB output to drive an RGB monitor. It also goes to a color encoder to drive a composite video monitor or VCR.

The major system blocks of the Genlock unit are:

1) VCO and horizontal beam counter
2) Synch separator and detector
3) PLL (Phased locked loop)
4) Synch generator, color decoder timing generator, and horizontal and vertical reset generator
5) Color decoder
6) Color encoder and video overlay circuit

1. VCO and Horizontal Beam Counter

The VCO consists of TR2 and associated circuits. TR2 and varactor are the active elements of the 28.63636MHz *(28.37516MHz/PAL)* oscillator. The frequency changes approximately ±1MHz

as the VCO control voltage is varied +2/-3V around the 3.0V nominal operating point. The error voltage corresponds to the difference in phase between the horizontal synch of the source video and the computer. When they are in phase the oscillator is sitting at 28.63636MHz *(28.37516MHz)*.

The horizontal beam counter consists of divide-by-four prescaler, IC5 and IC8, and divide-by-455 *(453/PAL)* counter, IC2, IC3, IC4, and IC5. The 3.58MHz *(3.54MHz)* clock from the computer is used to generate the 7.16MHz *(7.08MHz)* prescaler output, so that it has a known time relation to the color clock of the computer. This insures that the horizontal reset signal, which is derived from the H-drive, has proper set-up and hold times when sampled by the computer's color clock.

2. Synch Separator and Detector

The source video synch separator consists of TR1 and associated components. The detected composite synch goes to the rest of the board and to the external synch detector, IC13. If there are external synch missing, the synch detector circuit switches the synch source of the Genlock to the A2000, so that the computer will be self-synchronized.

3. Phased Locked Loop

The phased locked loop consists of the VCO, horizontal beam counter, and phase comparator (sample-hold and analog switch circuit for NTSC; sample-hold and voltage comparator circuit for PAL). The basic theory of the operation of the PLL is to convert the relative position of the horizontal synch of the source video and horizontal drive signal to an error voltage to control the VCO. (The horizontal drive signal mirrors the horizontal synch of the A2000.) When the PLL is locked, the burst-flag is active during the proper portion of the horizontal drive. During the off time, the voltage is pulled down to 0Vdc to cut off the IC10. When the PLL is locked, pin 3 of the IC10 will be at 3V.

4. Synch Generator, Color Decoder Timing Generator, and Horizontal and Vertical Reset Generator

The horizontal synch separator, IC9, C34, and R39, triggers the leading edge of the composite synch generator. The output of the IC9 goes to the vertical synch separator circuit and to 1/2 IC11 which recreates the 4.8μsec horizontal sync for the RGB connector.

The horizontal reset circuit consists of IC5 and the horizontal counter. The reset signal occurs on the alternate cycle of the horizontal beam counter. A 32μsec/NTSC *(0.55μsec/PAL)* reset pulse is sent to the computer at the beginning of every other line.

The vertical synch separator consists of IC9, R40 and C33. The R40 and C33 have an integrator input which filters the vertical synch information from the composite synch.

The vertical reset pulse is generated on the odd fields to reset the vertical beam counter of the computer. The field detect circuit consists of IC12, C9 and R11. The circuit is configured to detect odd fields and is connected to the vertical reset logic so that the reset to the computer is sent on the odd field.

5. Color Decoder

Once the computer video is synched to the source video, the source video is decoded by the color decoder, IC14. All of the controls for IC14 are preselected with the exception of hue. (Hue does not apply for PAL.) The RGB output of IC14 goes to the color encoder, IC15.

6. Color Encoder and Video Overlay Circuit

The color encoder, IC15, takes the RGB outputs of the color decoder and converts it to NTSC or PAL composite signals. It also has the capability of switching an external RGB signal over the decoded RGB signal. The composite output signal drives 1Vp-p into a 75 ohm load. The RGB output signal drives 0.6Vp-p into a 75 ohm load.

Component Functions

1. Variable components function

Location No.	Name	Function
VR 1	BRIGHTNESS	Brightness control for external source video input.
VR 2	COLOR	Gain control of chroma amplifier for external source input.
VR 3	FSC	To adjust free-running frequency of color subcarrier.
VR 4	HUE	HUE control. (Does not apply to PAL.)
VR 5	H-POSITION	To adjust computer composite synch timing.
VR 6	BURST BLANK	To adjust burst blanking during vertical interval.
L6	VCO	To adjust PLL in range.

2. IC's function

Location No.	Name	Function
IC 12	V7010	• Fundamental clock generator for CPU PLL • Phase detector for CPU main clock generator • Field ID detector
IC 13	NJM2220	• External video signal detector by horizontal interval timing
IC 14	V7020	• Color decoder for external source video
IC 15	V7040	• Pixel switch • Composite color encoder for external video and computer • 75 ohm RGB and composite video driver

Location No.	Name	Function
IC 8 IC 5	74S74 3/4 74LS00	• PLL prescaler/divide by 8
IC 1 IC 2 IC 3 IC 4 IC 5	74LS30 74LS161 74LS161 74LS161 1/4 74LS00	• PLL count down/divide by 455 (453 for PAL) • Horizontal reset pulse generator
IC 11	1/2 74LS221	• Computer H-sync phase shifter
IC 11	1/2 74LS221	• Horizontal sync width generator
IC 10	74HC4066	• PLL select (computer or genlock) • Phase comparator and sample-hold • Composite synch select
IC 7	74AC04	• Clock amp • Clock driver • Horizontal-drive current amp
IC 6	74HC00	• Genlock mode selector
IC 9	74HC14	• Composite synch driver • Horizontal synch separator • Vertical synch separator

3. Mode Switch Function

Computer Only: The Genlock system provides the computer video signal. The CPU clock is generated by the V7010 fundamental clock generator and the PLL frequency multiplier. However, if external video is present, the Genlock system provides frame reset, horizontal reset, and the CPU clock. These are synchronized by the external source video timing.

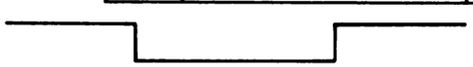
Overlay Computer and Source: If an external video source is not provided, the computer is self-synchronized. If external video is present, the Genlock system provides frame reset, horizontal reset, and the CPU clock. These are synchronized by the external source video timing.

Source Video Only: The Genlock system provides the external video source only to the RGB and composite video outputs.

Connectors

1. Interface connector (to the computer)

No.	Signal	In/Out	Function
1	NC	...	No connection
2	NC	...	No connection
3	L.AUDIO IN	IN	No use
4	R.AUDIO IN	IN	No use
5	NC	...	No connection
6	+5V	IN	+5V dc input
7	R	IN	Red video input
8	+5V	IN	+5V dc input
9	GND	...	Signal ground
10	+12V	IN	+12V dc input
11	G	IN	Green video input
12	GND	...	Signal ground
13	GND	...	Signal ground
14	C	IN	Digital composite synch
15	B	IN	Blue video input
16	XCLK EN	OUT	External clock enable output
17	GND	...	Signal ground
18	B BST	IN	No use
19	C4	IN	No use
20	GND	...	Signal ground
21	GND	...	Signal ground
22	HSV	OUT	Horizontal reset output
23	DI	IN	No use
24	GND	...	Signal ground
25	DB	IN	No use
26	VSY	OUT	Vertical reset output
27	DG	IN	No use
28	QSY	IN	No use
29	DR	IN	No use
30	ZD	IN	Pixel switch input
31	±5V	IN	No use
32	GND	...	Signal ground
33	XCLK	OUT	28MHz clock output
34	Cl	IN	3.58MHz clock input (3.54MHz/PAL)
35	NC	...	No connection
36	NC	...	No connection



36 2 COMPONENTS SIDE
35 1 SOLDER SIDE

2. Male 23-pin "D" type connector

No.	Signal
1	No connection
2	No connection
3	Red video input
4	Green video input
5	Blue video input
6	No connection
7	No connection
8	No connection
9	No connection
10	Composite sync output
11	Horizontal sync output
12	Vertical sync output
13	No connection
14	No connection
15	No connection
16	Signal ground
17	Signal ground
18	Signal ground
19	Signal ground
20	Signal ground
21	No connection
22	No connection
23	No connection

Electrical Characteristics

Characteristics	Jack	Pin	Min	Typ	Max	Units
Supply current 5V	CN4	6, 8				mA
Supply current 12V	CN4	10				mA
RGB input	CN4	7, 11, 15		700		mVp-p
RGB input impedance				75		ohm
C-synch V(IH)	CN4	14	2.0			Vdc
C-synch V(IL)					0.8	Vdc
Cl-clock V(IH)	CN4	34	2.0			Vdc
Cl-clock V(IL)					0.8	Vdc
28MHz V(OH)	CN4	33	2.0			Vdc
28MHz V(OL)					0.4	Vdc
H-reset V(OH) −800uA	CN4	22	2.4			Vdc
H-reset V(OL) 16mA					0.4	Vdc
V-reset V(OH) −800uA	CN4	26	2.4			Vdc
V-reset V(OL) 16mA					0.4	Vdc
RGB output impedance	CN1	3, 4, 5		75		ohm
RGB output signal				700		mVp-p
C-synch V(OH) −12mA	CN1	10	2.4			Vdc
C-synch V(OL) 12mA					0.4	Vdc
H-synch V(OH) −12mA	CN1	11	2.4			Vdc
H-synch V(OL) 12mA					0.4	Vdc
V-synch V(OH) −12mA	CN1	12	2.4			Vdc
V-synch V(OL) 12mA					0.4	Vdc
Video input impedance	CN2			75		ohm
Video input signal				1.0		Vp-p
Video output impedance	CN3			75		ohm
Video output signal				1.0		Vp-p

Adjustment Procedure

NOTE: THE A2300/2301 GENLOCK ADJUSTMENTS SHOULD ONLY BE MADE BY QUALIFIED PERSONNEL USING CALIBRATED TEST EQUIPMENT. ATTEMPTS TO ADJUST THE A2300/2301 GENLOCK BY UNQUALIFIED PERSONS AND/OR FAILURE TO FOLLOW THE PROCEDURES OUTLINED HERE MAY RESULT IN UNSATISFACTORY PERFORMANCE OF THE GENLOCK UNIT AND/OR A2000 SYSTEM FAILURE. MALADJUSTMENT WILL NOT BE COVERED UNDER WARRANTY SERVICE.

Required Test Equipment

LEADER LCG-396 PATTERN GENERATOR or equivalent (NTSC)
LEADER LCG-396PAL PATTERN GENERATOR or equivalent (PAL)
HEWLETT PACKARD 5316-A FREQUENCY COUNTER or equivalent
HITACHI V-1100 OSCILLOSCOPE or equivalent
LEADER LVS-5850B VECTORSCOPE or equivalent (NTSC)
LEADER LVS-5851A VECTORSCOPE or equivalent (PAL)

Checking Calibration of NTSC (PAL) Generator

Verify 1.0 volt peak-peak video output from NTSC (PAL) Pattern Generator and chroma levels and Fig. 1 on oscilloscope display. Verify CHROMA phase angles and levels on vectorscope display. Refer to test equipment operating manuals if levels are incorrect.

Adjustment Controls

VR1 Video Output Level
VR2 Chroma Output Level
VR3 Sub-Carrier Free Run Frequency
VR4 Chroma Phase Angle (TINT)—NTSC Only
VR5 Computer Overlay Horizontal Position
VR6 Burst Holdoff
SW1 Genlock Mode Switch 3 Position

Adjustment Order

CONTROL	INPUT	MODE SWITCH	OUTPUT	ADJUSTMENT
VR3	n/a	COMPUTER ONLY	COUNTER	NOTE 1
VR6	n/a	COMPUTER ONLY	OSCILLOSCOPE	NOTE 2
VR5	n/a	OVERLAY	OSCILLOSCOPE	NOTE 3
VR1	GENERATOR	EXTERNAL ONLY	OSCILLOSCOPE	NOTE 4
VR2	GENERATOR	EXTERNAL ONLY	VECTORSCOPE	NOTE 5
VR4	GENERATOR	EXTERNAL ONLY	VECTORSCOPE	NOTE 6

NOTE 1: Sub-Carrier free run frequency adjust. Measure at C61 near pin 1 or 1C 14 while adjusting VR3. Be sure no external video is connected to the Genlock VIDEO IN.

NTSC 3.579545 MHZ ± 25 HZ
PAL 4.433619 MHZ ± 25 HZ

NOTE 2: Burst Hold-off adjust. Monitor Vertical sync'd video output from Genlock and adjust VR6 for no burst in vertical sync area.

NOTE 3: Computer overlay horizontal adjust. Monitor line sync'd video output and adjust VR5 so computer video is centered on source video.

NOTE 4: Video output level adjust. Monitor line sync'd video output and adjust VR1 for 1.0 volt peak to peak (sync tip to 100% white).

NOTE 5: Chroma output level adjust. Monitor vectorscope for best match to IRE targets while adjusting VR2.

NOTE 6: Chroma phase angle adjust. (NTSC Only) Monitor vectorscope for best match to IRE targets while adjusting VR4.

BE SURE TO HAVE A PROPER 75 OHM LOAD ON THE VIDEO OUTPUT FOR ALL MEASUREMENTS. USE ONLY 75 OHM COAXIAL CABLE FOR INTER-CONNECTIONS.

COMPONENT PARTS LIST

PLEASE NOTE: Commodore part numbers are provided for reference only and do not indicate the availability of parts from Commodore. Industry standard parts (Resistors, Capacitors, Connectors) should be secured locally. Approved cross-references for TTL chips, Transistors, etc. are available in manual form through the Service Department, order part #314000-01.

INTEGRATED CIRCUITS

	A2300	A2301
IC1	HD74LS3OP	HD74LS3OP
IC2	HD74LS161P	HD74LS161P
IC3	HD74LS161P	HD74LS161P
IC4	HD74LS161P	HD74LS161P
IC5	HD74LS00P	HD74LS00P
IC6	HD74LS00P	HD74HC00P
IC7	HD74AC04P	HD74AC04P
IC8	HD74LS74P	HD74LS74P
IC9	HD74HC14P	HD74HC14P
IC10	TC74HC4066P	TC74HC4066P
IC11	HD74LS221P	HD74LS221P
IC12	V7010	V7010
IC13	NJM2220S	NJM2220S
IC14	V7020	V7020
IC15	V7040	V7040
IC16	NJM556D	NJM556D
IC17	HA17805	HA17805

RESISTORS — All are carbon 1/6 watt

	A2300	A2301
R1	27Ω	27Ω
R2	47Ω	47Ω
R3	27Ω	27Ω
R4	47Ω	47Ω
R5	27Ω	27Ω
R6	47Ω	47Ω
R7	10KΩ	10KΩ
R8	1MΩ	1MΩ
R9[1]	27KΩ	27KΩ
R10	150KΩ	100KΩ
R11	330KΩ	330KΩ
R12	100KΩ	150KΩ
R13	100Ω	100Ω
R14	220KΩ	220KΩ
R15	1KΩ	1KΩ
R16	33KΩ	33KΩ
R17	10KΩ	10KΩ
R18	75Ω	75Ω
R19	75Ω	75Ω
R20	1KΩ	1KΩ
R21	1KΩ	1KΩ
R22	1KΩ	1KΩ
R23	470Ω	470Ω
R24	390KΩ	390KΩ
R25	180KΩ	180KΩ
R26		390Ω
R27	1.5KΩ	1.5KΩ
R28	1.8KΩ	1.8KΩ
R29	22KΩ	22KΩ
R30	2.2KΩ	2.2KΩ
R31	1.2KΩ	1.2KΩ
R32	6.2KΩ	6.2KΩ

RESISTORS (continued)

	A2300	A2301
R33	2.2KΩ	
R34	2.2KΩ	15KΩ
R35	15KΩ	390Ω
R36		3.9KΩ
R37		820Ω
R38		1.8KΩ
R39	1.8KΩ	1.5KΩ
R40	1.5KΩ	4.7KΩ
R41	4.7KΩ	22KΩ
R42	22KΩ	100KΩ
R43	100KΩ	4.7KΩ
R44	4.7KΩ	68Ω
R45	68Ω	4.7KΩ
R46	4.7KΩ	470Ω
R47	470Ω	10KΩ
R48	10KΩ	
R49	100Ω	10KΩ
R50	10KΩ	10KΩ
R51	10KΩ	10KΩ
R52	10KΩ	6.2KΩ
R53	6.2KΩ	470Ω
R54	470Ω	68Ω
R55	68Ω	68Ω
R56	68Ω	68Ω
R57	68Ω	68Ω
R58	68Ω	1KΩ
R59	1KΩ	10KΩ
R60		1KΩ
R61	1KΩ	1KΩ
R62	1KΩ	10KΩ
R63	10KΩ	1KΩ
R64	1KΩ	2.2KΩ
R65	2.7KΩ	75KΩ
R66	75Ω	27KΩ
R67	22KΩ	10KΩ
R68		10KΩ
R69	11KΩ	2.2KΩ
R70	2.2KΩ	2.2KΩ
R71	2.2KΩ	75KΩ
R72	62KΩ	47KΩ
R73	47KΩ	4.7KΩ
R74	4.7KΩ	47KΩ
R75	47KΩ	47KΩ
R76	47KΩ	4.7KΩ
R77	4.7KΩ	150Ω
R78	150Ω	150Ω
R79	150Ω	150Ω
R80	150Ω	10KΩ
R81	10KΩ	
R82	47KΩ	47KΩ
R83	1KΩ	3.9KΩ
R84		7.5KΩ
R85		1KΩ

[1] ± 1%

COMPONENT PARTS LIST *(Continued)*

DIODES

	A2300	A2301
D1	1SS119	1SS119
D2	1SS119	1SS119
D3	1SS119	1SS119
D4	1SS119	1SS119
D5	1SV101	1SV101
D6	1SS106	1SS106
D7	1SS106	1SS106
D8		1SS106
D9		1SS106
D10		1SS106
D11		1SS106
D12		1SS106
D13	1SS119	1SS119
D14	1SS119	1SS119
D15	1SS106	1SS106

CAPACITORS

	A2300	A2301	
C1	33pF	33pF	Ceramic
C2	10pF	10pF	Ceramic
C3	0.02μF	0.02μF	Ceramic
C4	100μF 10V	100μF 10V	Alumi Elect
C5	0.1μF	0.1μF	Ceramic
C6	0.1μF	0.1μF	Ceramic
C7	0.1μF	0.1μF	Ceramic
C8	1μF*	0.1μF	*Alumi Elect Ceramic
C9	0.1μF	0.1μF	Plastic Film
C10	1μF 50V	10μF 16V	Alumi Elect
C11	10μF 50V	1μF 50V	Alumi Elect
C12	5600pF	5600pF	Plastic Film
C13	1000pF	1000pF	Ceramic
C14	1μF 50V	1μF 50V	Alumi Elect
C15	0.02μF	0.02μF	Ceramic
C16	0.1μF	0.1μF	Plastic Film
C17	0.047μF	0.047μF	Plastic Film
C18	1μF 50V	1μF 50V	Alumi Elect
C19	1μF 6.3V	1μF 50V	Alumi Elect
C20	0.01μF	0.01μF	Plastic Film
C21	0.047μF	0.047μF	Plastic Film
C22	0.1μF	0.1μF	Ceramic
C23	0.47μF	0.47μF	Plastic Film
C24	0.1μF	0.1μF	Ceramic
C25			
C26		0.01μF	Ceramic
C27	470μF 6.3V	470μF 6.3V	Alumi Elect
C28	0.47μF	0.47μF	Plastic Film
C29	0.1μF	0.1μF	Ceramic
C30	22pF	22pF	Ceramic
C31	47pF	47pF	Ceramic
C32		0.01μF	Plastic Film
C33	0.022μF	0.022μF	Plastic Film

CAPACITORS (continued)

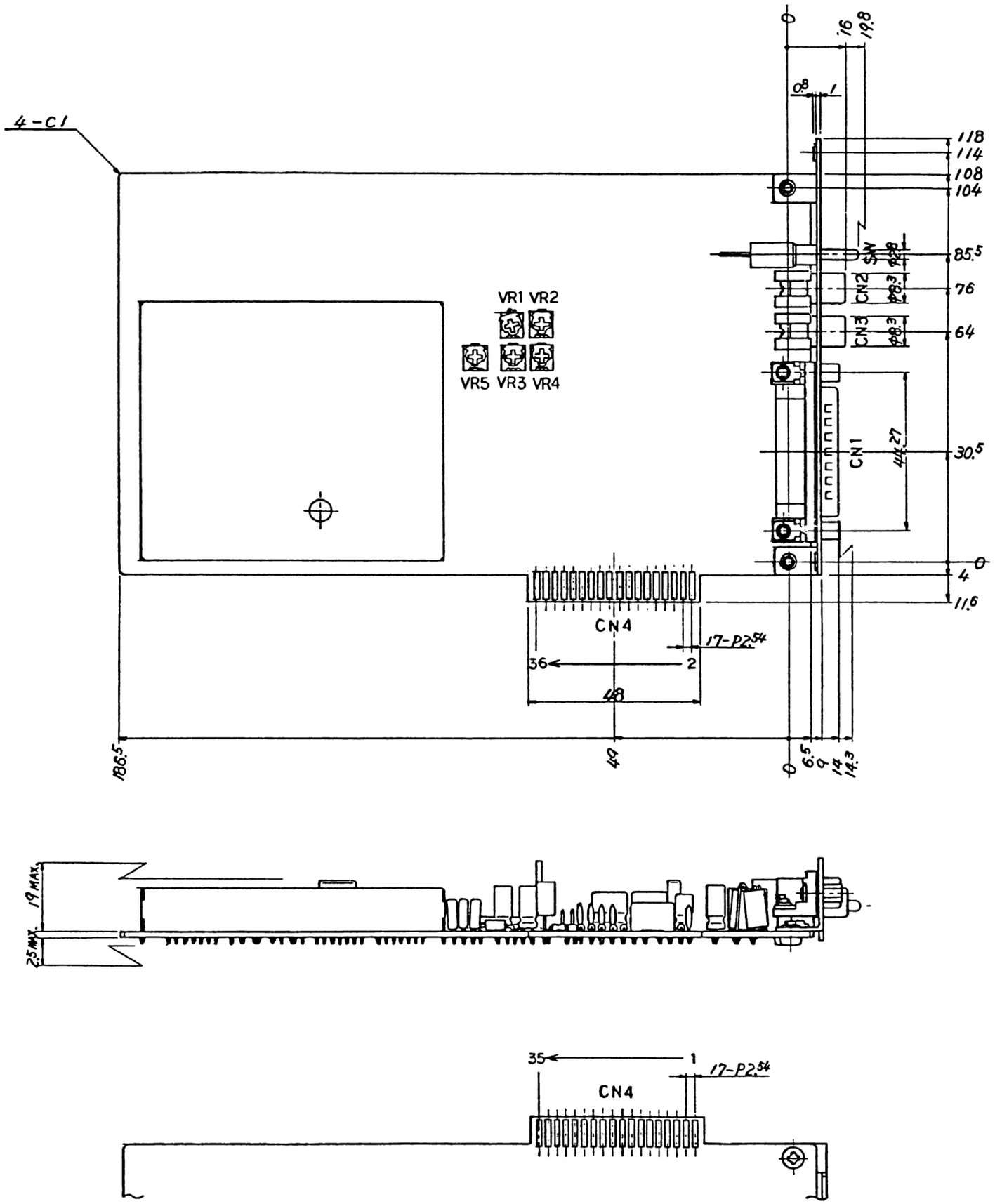
	A2300	A2301	
C34	2200pF	2200pF	Ceramic
C35	1000pF	1000pF	Ceramic
C36	100μF 10V	100μF 10V	Alumi Elect
C37	0.047μF	0.047μF	Plastic Film
C38	47pF	47pF	Ceramic
C39	18pF	18pF	Ceramic
C40	18pF	18pF	Ceramic
C41	39pF	39pF	Ceramic
C42	39pF	39pF	Ceramic
C43	39pF	39pF	Ceramic
C44	220pF		Ceramic
C45	2200pF	2200pF	Ceramic
C46	100μF 10V	100μF 10V	Alumi Elect
C47	0.02μF	0.02μF	Ceramic
C48	470μF 6.3V	470μF 6.3V	Alumi Elect
C49	470μF 6.3V	470μF 6.3V	Alumi Elect
C50	470μF 6.3V	470μF 6.3V	Alumi Elect
C51	470μF 6.3V	470μF 6.3V	Alumi Elect
C52	10μF 16V	10μF 16V	Alumi Elect
C53	0.1μF	0.1μF	Ceramic
C54	0.1μF	0.1μF	Plastic Film
C55	0.1μF	0.1μF	Ceramic
C56	0.1μF	0.1μF	Ceramic
C57	0.1μF	0.1μF	Ceramic
C58	0.1μF	0.1μF	Ceramic
C59	0.1μF	0.1μF	Ceramic
C60	0.1μF	0.1μF	Ceramic
C61	0.01μF	0.01μF	Plastic Film
C62	0.02μF	0.02μF	Ceramic
C63	0.02μF	0.02μF	Ceramic
C64	0.02μF	0.02μF	Ceramic
C65	0.02μF	0.02μF	Ceramic
C66	0.02μF	0.02μF	Ceramic
C67	0.02μF	0.02μF	Ceramic
C68		0.02μF	Ceramic
C69	0.022μF	0.022μF	Plastic Film
C70	0.022μF	0.022μF	Plastic Film
C71	2200pF	2200pF	Ceramic
C72	0.022μF	0.022μF	Plastic Film
C73	0.22μF	0.22μF	Plastic Film
C74	10μF 16V	10μF 16V	Alumi Elect
C75	10μF 16V	10μF 16V	Alumi Elect
C76	33pF	33pF	Ceramic
C77	22μF 16V	39pF*	Alumi Elect *Ceramic
C78[1]	0.1μF		Ceramic
C79[1]	0.1μF		Ceramic
C80[1]	0.1μF		Ceramic
C81[1]	0.1μF		Ceramic
C82[1]	0.1μF		Ceramic
C83[1]	0.1μF		Ceramic
C84[1]	0.1μF		Ceramic
C85[1]	0.1μF		Ceramic

[1]Low ESR Capacitor

COMPONENT PARTS LIST *(Continued)*

TRANSISTORS			
	A2300	**A2301**	
TR1	2SA564	2SA564	
TR2	2SC460	2SC460	
TR3	2SC1684	2SC1684	
TR4	2SC1684	2SC1684	
MISCELLANEOUS			
	A2300	**A2301**	
L1			
L2		8.2μH	Axial Inductor
L3		8.2μH	Axial Inductor
L4			
L5	10μH	10μH	Axial Inductor
L6	0.6μH	0.6μH	Oscillator Coil
L7	1.2μH		Axial Inductor
DL1	600 nsec.	600 nsec.	Delay Line
DL2	400 nsec.	400 nsec.	Delay Line
DL3		63.943 sec.	Delay Line
BPF1	3.58 MHz	4.43 MHz	Band Pass Filter
BPF2	3.58 MHz	4.43 MHz	Band Pass Filter
VR1	500Ω	500Ω	Variable Res.
VR2	500Ω	500Ω	Variable Res.
VR3	500Ω	500Ω	Variable Res.
VR4	5KΩ		Variable Res.
VR5	5KΩ	5KΩ	Variable Res.
VR6	10KΩ	10KΩ	Variable Res.
X1	3.579545 MHz	3.546895 MHz	Crystal
X2	3.579545 MHz	4.433619 MHz	Crystal

MISCELLANEOUS (continued)			
	A2300	**A2301**	
EM1	270pF	270pF	EMI Filter
EM2	270pF	270pF	EMI Filter
EM3	270pF	270pF	EMI Filter
EM4	FBA04VA900NA-00	FBA04VA900NA-00	EMI Filter
EM5	FBA04VA900NA-00	FBA04VA900NA-00	EMI Filter
EM6	FBA04VA900NA-00	FBA04VA900NA-00	EMI Filter
EM7	FBA04HA450NA-00	FBA04HA450NA-00	EMI Filter
EM12	FBA04HA450NA-00		EMI Filter
EM13	FBA04HA450NA-00		EMI Filter
TC1	30pF	30 pF	Ceramic Trimmer Cap
RY1	RZ-5W-K	RZ-5W-K	Relay
CN1	CA-M59	CA-M59	D-Sub Connector
CN2	JPJ 1018	JPJ 1018	RCA Phono Jack
CN3	JPJ 1018	JPJ 1018	RCA Phono Jack
CN4			6-Pin Header



2300 GENLOCK — NTSC
312805-01 PCB OUTLINE
Sheet 1 of 2

NO.	CN 1
1	N C
2	N C
3	R
4	G
5	B
6	N C
7	N C
8	N C
9	N C
10	C-SYNC
11	H
12	V
13	N C
14	N C
15	N C
16	GND
17	GND
18	GND
19	GND
20	GND
21	N C
22	N C
23	N C

	CN 2
	VIDEO IN

	CN 3
	VIDEO OUT

NO.	CN 4
1	N C
2	N C
3	AUDIO(L)
4	AUDIO(R)
5	N C
6	+5 V
7	R
8	+5 V
9	GND
10	+12 V
11	G
12	GND
13	GND
14	$\overline{C}$
15	B
16	$\overline{EXCLKEN}$
17	GND
18	B BST
19	$\overline{C}$ 4
20	GND
21	GND
22	$\overline{H\text{-}SYNC}$
23	D I
24	GND
25	D B
26	$\overline{V\text{-}SYNC}$
27	D G
28	$\overline{C\text{-}SYNC}$
29	D R
30	Y S
31	-5 V
32	GND
33	$\overline{EXCLK}$
34	$\overline{C}$ I
35	N C
36	N C

	VR 1
	BRIGHT ADJ.

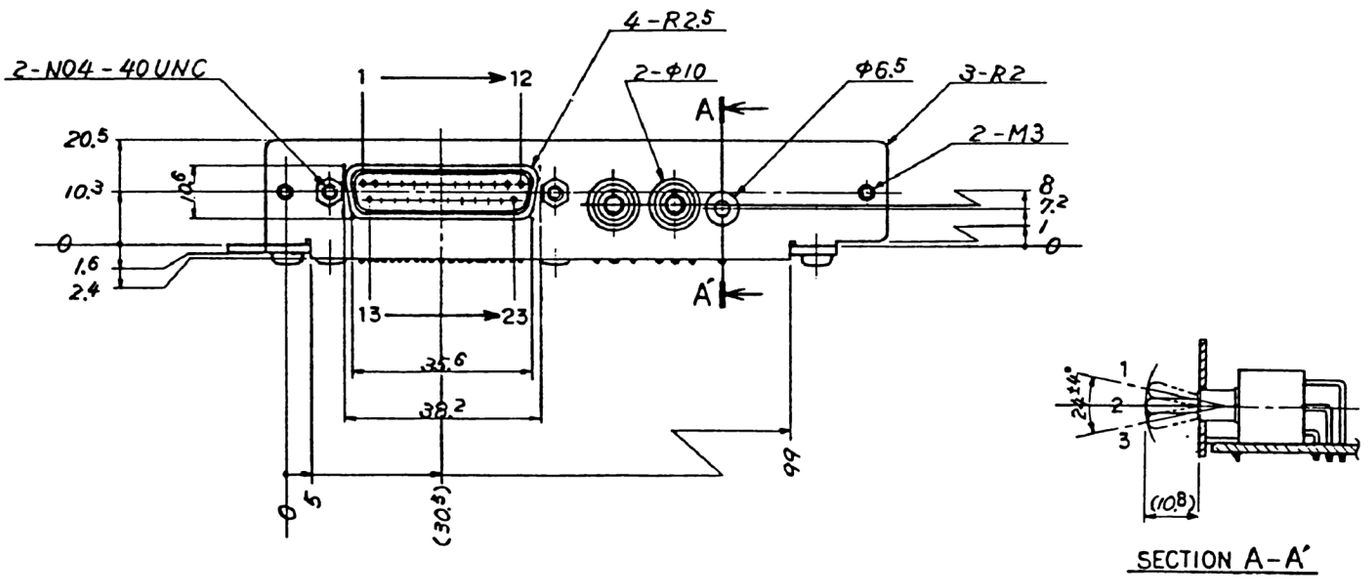
	VR 2
	COLOR ADJ.

	VR 3
	F.S.C. ADJ.

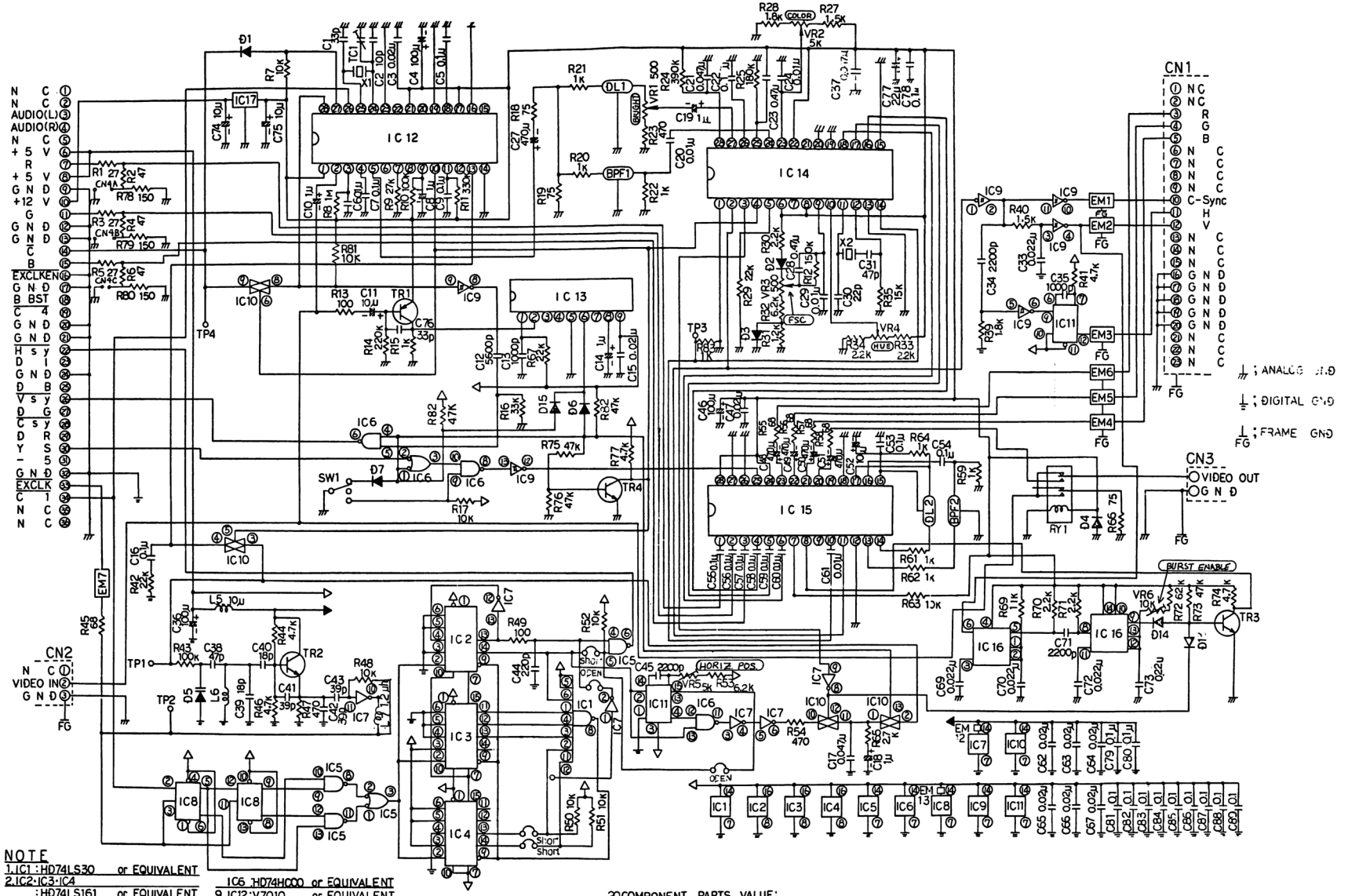
	VR 4
	HUE ADJ.

	VR 5
	H-POSITION ADJ.

NO.	SW
1	P. C. MODE
2	OVER LAY MODE
3	SOURCE VIDEO MODE



2300 GENLOCK — NTSC
312805-01 PCB OUTLINE
Sheet 2 of 2



NOTE

1. IC1 : HD74LS30 or EQUIVALENT
2. IC2・IC3・IC4 : HD74LS161 or EQUIVALENT
3. IC5・ : HD74LS00 or EQUIVALENT
4. IC7 : HD74AC04 or EQUIVALENT
5. IC8 : HD74S74 or EQUIVALENT
6. IC9 : HD74HC14 or EQUIVALENT
7. IC10 : TC74HC4066 or EQUIVALENT
8. IC11 : HD74LS221 or EQUIVALENT
9. IC12 : V7010 or EQUIVALENT
10. IC13 : NJM2220S or EQUIVALENT
11. IC14 : V7020 or EQUIVALENT
12. IC15 : V7040 or EQUIVALENT
13. IC17 : V78C5 or EQUIVALENT
14. D1~D4 : 1SS119 or EQUIVALENT
15. D5 : 1SV101 or EQUIVALENT

IC6 : HD74HC00 or EQUIVALENT

15. D6~D15 : 1SS106 or EQUIVALENT
17. TR1 : 2SA564 or EQUIVALENT
18. TR2 : 2SC460 or EQUIVALENT
19. X1・X2 : 3.579545MHz or EQUIVALENT

20. COMPONENT PARTS VALUE:
R=Ω, C=F, L=H
21. SW1 SHOWN IN COMPUTER ONLY POSITION
22. CN4A-C SHORTED FOR 4 LAYER GERMAN BUILT A2000'S ONLY

2300 GENLOCK — NTSC
312804-01 REV. A